

CORRESPONDENCE/MEMORANDUM

DATE: April 17, 2000

TO: Natural Resources Board

FROM: George E. Meyer

FILE REF: 4519-22b

SUBJECT: Update on the Status for Wisconsin's Plan to Attain the 1-Hour Ozone Standard

1. INTRODUCTION

This plan represents an important milestone in addressing eastern Wisconsin's long-standing ozone problem. It focuses on providing a demonstration of attainment of the national ambient air quality standard for 1-hour concentrations of ozone by 2007 and maintenance of the standard thereafter. It also achieves federally mandated deadlines to reduce emissions of volatile organic compounds (VOC) and nitrogen oxides (NO_x) for the milestone years of 2002, 2005 and 2007. **Table 1** shows the maximum VOC and NO_x emissions in 2002, 2005 and 2007 that are allowable under federal rate-of-progress requirements.

Table 1 - Rate-of-Progress Requirements for 2002-2007

Maximum Allowable Emissions	2002		2005		2007	
	VOC (Tons/Day)	NO _x (Tons/Day)	VOC (Tons/Day)	NO _x (Tons/Day)	VOC (Tons/Day)	NO _x (Tons/Day)
	234	368	225	340	218	324
Overall Reduction Required from Base Year (1990)	36%		45%		51%	

The requirements of EPA's NO_x SIP Call issued in 1998 do not currently apply to NO_x sources in Wisconsin by virtue of a decision issued by the US Court of Appeals for the District of Columbia in March 2000. This decision reinstated the application of the EPA's NO_x SIP Call to major NO_x sources in states upwind of Wisconsin, but exempted Wisconsin NO_x sources, since EPA could not demonstrate that Wisconsin sources significantly contribute to violations of the 1-hour ozone standard in downwind states.

This plan is designed to assure that NO_x and VOC emissions from sources in Wisconsin, in conjunction with anticipated VOC and NO_x emissions from sources in upwind states, do not cause violations of the 1-hour ozone standard. The plan assumes that the NO_x SIP Call issued by USEPA is upheld. This plan is not designed to achieve future federal requirements related to 8-hour ozone

concentration, fine particulate matter or regional haze, even though actions taken to implement the plan may reduce these problems. The plan includes elements that:

- Demonstrate improved air quality sufficient to attain the 1-hour ozone standard by 2007;
- Achieve the federally mandated rate-of-progress (ROP) deadlines for reducing VOC and NOx emissions in the milestone years of 2002, 2005 and 2007;
- Establish VOC and NOx emission budgets for stationary, mobile and area sources in 2002, 2005 and 2007;
- Establish Reasonably Available Control Technology (RACT) requirements for VOC emissions from industrial solvent clean-up operations in southeastern Wisconsin;
- Revise NR 410 to establish a federally mandated excess emissions fee of \$5000/ton of VOC for major source emissions in southeastern Wisconsin if this area remains in nonattainment for ozone in 2008.

2. NOx EMISSIONS CONTROLS

This plan includes controls on sources in Wisconsin only to the extent needed to meet and maintain the 1-hour ozone standard. This plan is based on the assumption that major NOx sources in upwind states are required to achieve the limit of 0.15 lbs of NOx /MMBTU as set forth in EPA's NOx SIP Call. This plan was developed through application of mathematical models used by the Lake Michigan Air Directors Consortium (LADCO) to predict ozone formation and transport. If there are significant changes in the SIP Call requirements as a result of pending litigation (which is unlikely to be resolved before December 31, 2000, (the submittal deadline for this plan)), this plan will need to be revised. The plan revisions are necessary, because the ROP requirements in the plan are not sufficient to attain the 1-hour standard.

Controlling NOx from Stationary Sources

The proposed NOx controls for major sources are driven by a federal requirement to achieve stepped emission reductions between 1999 and 2007, using a maximum milestone interval of 3 years. By 2007, the aggregate reductions must show achievement and guarantee maintenance of the 1-hour ozone standard. The most recent technical evaluations of various options for attaining the ozone standard indicate a need to focus the emissions control effort on NOx sources as well as VOC sources.

NOx controls are proposed for the nine counties of southeast Wisconsin designated as either severe or moderate ozone nonattainment areas under the Clean Air Act. These nine counties are called the "Primary Ozone Control Region". The proposal to be taken to public hearing will also request comment on expanding the Primary Ozone Control Region to include additional counties in the state that also contain VOC and NOx sources that directly affect peak 1-hour ozone concentrations in the nonattainment counties. The broader area includes an additional 21 county region stretching from Crawford County in the southwest, diagonally northeastward, to Door County. This area is called

“Secondary Ozone control Region.” **Figure 1** on page 4 is a map that shows the counties in the Primary and Secondary Ozone Control Regions.

The largest area considered for emission controls for 2007 and beyond includes the full MAIN electrical supply region (47 counties), while the minimum control area considered for 2007 includes the smaller, 30 county, Primary and Secondary Ozone Control Regions. The proposed plan contains the following control regions: a Primary Ozone Control Region (9 counties), a Secondary Ozone Control Region (21 counties), a Primary Ozone Maintenance Region (17 counties), and a Secondary Ozone Maintenance Region (the 25 county MAPP Region). These regions contain VOC and NO_x emission sources that may have an impact on ozone levels in the nonattainment counties (the Primary Ozone Control Region).

The proposal sets corporate, system-average, NO_x emission rates for the major electric generation units in the primary control region, for the milestone years of 2002, 2005 and 2007. To ensure maintenance of the 1-hour standard after 2007, the plan includes NO_x controls for major stationary sources in the Primary and Secondary Ozone Control Regions. These NO_x controls are designed to limit growth in emissions to a level consistent with the air quality analysis performed for the region. There are three principal components to the maintenance portion of the plan: performance standards for existing sources, performance standards for new sources, and an offset requirement for new sources. The plan establishes performance standards for major existing NO_x sources not addressed by the system-average limits. The plan requires performance standards for NO_x emissions for new facilities, which are not subject to limits based on lowest achievable emission rate (LAER) or best achievable control technology (BACT). The plan also requires NO_x offsets of 1:1 for installations permitted after January 1, 2001.

The proposed NO_x controls incorporate NO_x reduction credit trading as an alternate compliance tool for sources adopting adequate NO_x emission monitoring and tracking systems. The proposed NO_x limits and performance standards are based on fuel type, combustion unit type, and size.

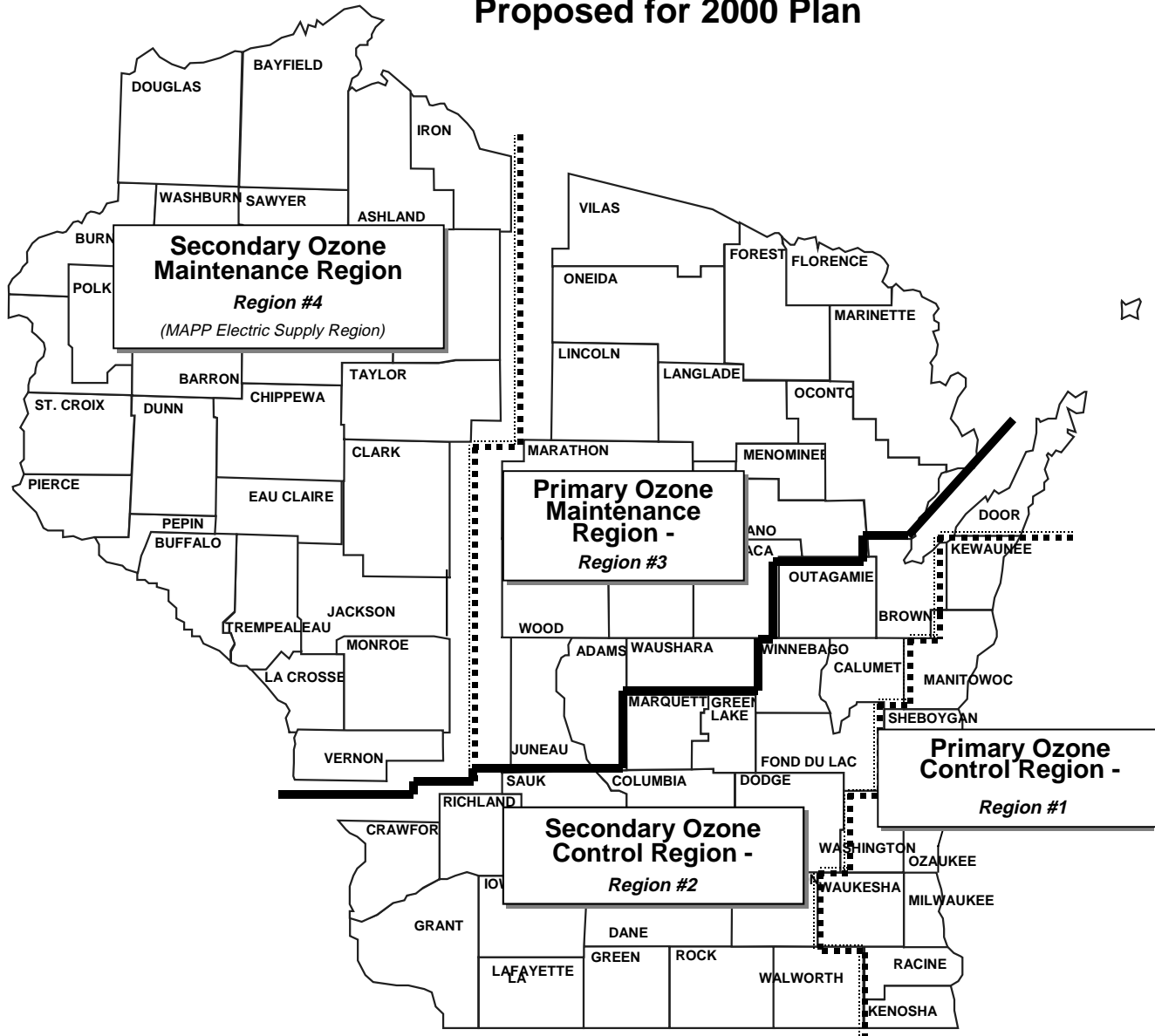
Proposed options for achieving the 2002, 2005 and 2007 ROP milestones will be considered at the public hearings. The options range from a modest control level focused on a broad range of sources in the applicable region to a robust effort that reflects tighter controls, on a smaller number of the largest NO_x sources.

Appendix 1 contains information on the level of emission control being proposed for various source categories in the primary and secondary ozone control and maintenance regions. **Appendix 2** includes proposed NO_x emissions limitations for stationary sources in the primary and secondary control regions needed to assure compliance with the 1-hour ozone standard after 2007. **Appendix 3** contains detailed information on various options for meeting ROP requirements at stationary sources.

Appendix 4 contains detailed information on the 1-hour ozone levels predicted by the LADCO models in regard to the attainment of the 1-hour standard. It also contains information about the predicted 8-hour ozone levels that result from implementation of this plan.

FIGURE 1

Wisconsin NOx Control Regions for Ozone Proposed for 2000 Plan



Controlling NOx from Motor Vehicles

While the current motor vehicle inspection program tests for VOC and NOx emissions, at this time there are no enforceable limits on NOx emissions (NOx cutpoints). These limits were suspended in prior to the December 1995 start date for NOx testing when the ozone standard attainment strategy was refocused exclusively on VOC control. Implementing NOx cutpoints has been the subject of extensive stakeholder dialogue since 1998 when this option was evaluated for inclusion in the plan required by EPA's NOx SIP Call.

Repairs needed to meet NOx cutpoints have been found to be highly cost-effective in relation to other potential NOx and VOC controls for the mobile sector. Therefore, one option to be taken to hearing to meet the ROP requirements for 2002, 2005, 2007 will include implementation of NOx cutpoints. Implementation of NOx cutpoints starting on May 1, 2001 will result in a reduction of approximately 12 tons per day of NOx. This is approximately 18% of the 66 ton per day reduction of NOx required between 1999 and 2002. While creditable NOx reductions from NOx cutpoints will decline (to approximately 6 tons per day in 2007), they are one of the most viable NOx reduction options available for 2002. If NOx cutpoints are not used to meet ROP requirements for 2002, an equivalent level of reduction will be required of other sources.

Table 2 is a table that provides information on key aspects of the options to be taken to hearing to meet the ROP requirements for 2002, 2005 and 2007. Table 2 provides a comparison of the degree of NOx reduction required at stationary sources including large electrical generating units (EGU's) with and without NOx cutpoints being effective in 2001.

Transportation Conformity

The Clean Air Act (CAA) requires a showing that regional transportation plans, and Transportation Improvement Plans (TIPs), conform to the emissions budgets for the mobile sector for the milestone years of 2002, 2005 and 2007. These emissions budgets are required to be included in this plan. Conformity assessment follows a coordinated, consultative process involving the Departments of Transportation and Natural Resources, the regional planning entities for areas with air quality problems, EPA and the Federal Highway Administration (FHWA).

Conformity budgets must address both VOC and NOx emissions for all ozone nonattainment areas designated under the CAA. These budgets need to reflect reasonably consistent planning assumptions between the Air Quality and Transportation planning processes and reflect the impact of emission forecasts and emission control programs incorporated into ROP plans and attainment demonstrations. The proposed Mobile Sector Budgets for 2002, 2005 and 2007 are compared to the aggregate ROP and stationary source budgets in Appendix 2. The proposed mobile sector budgets reflect updated mobile sector emissions modeling and vehicle miles traveled (VMT) projections that are similar to those in the Phase 2 Attainment Demonstration that the Department submitted in January, 2000 to EPA for approval.

Extensive dialogue with stakeholders resulted in refined mobile sector projections reflecting existing and proposed mobile sector emission control components and updated VMT projections to use for the

milestone years of 2002, 2005 and 2007. The revised budgets and projections in the plan will replace the budgets and projections that are in the Phase 2 Attainment Demonstration after they are approved by EPA.

TABLE 2- OPTIONS FOR MEETING RATE-OF-PROGRESS REQUIREMENTS

<u>NOx Control Options to Meet ROP</u>	Option 1A EGUs and Large Industrial Sources	Option 1B Large EGUs only	Option 2A EGUs and Large Industrial Sources	Option 2B Large EGUs only
	<u>With NOx Cutpoints</u> Includes Performance Standards in 2001 for New Facilities Cutpoints = 12 tpd in 2002, 8 tpd in 2005 & 6 tpd in 2007		<u>Without NOx Cutpoints</u> Includes Performance Standards in 2001 for New Facilities	
<u>2002 NOx Budget</u> 368 tpd with 66 tpd Reduction Objective	<u>EGU Compliance Rate:</u> 0.30 lb/mmbtu Performance Standards for Existing Facilities are Fully Implemented	<u>EGU Rate Compliance:</u> 0.27 lb/mmbtu No Performance Standards	<u>EGU Compliance Rate:</u> 0.26 lb/mmbtu Performance Standards for Existing Facilities are Fully Implemented	<u>EGU Compliance Rate:</u> 0.24 lb/mmbtu No Performance Standards
<u>2005 NOx Budget</u> 340 tpd with 71 tpd Reduction Objective	<u>EGU Compliance Rate:</u> 0.28 lb/mmbtu Performance Standards for Existing Facilities are Fully Implemented	<u>EGU Compliance Rate:</u> 0.25 lb/mmbtu No Performance Standards	<u>EGU Compliance Rate:</u> 0.25 lb/mmbtu Performance Standards for Existing Facilities are Fully Implemented	<u>EGU Compliance Rate:</u> 0.23 lb/mmbtu No Performance Standards
<u>2007 NOx Budget</u> 324 tpd with 74 tpd Reduction Objective	<u>EGU Compliance Rate:</u> 0.27 lb/mmbtu Performance Standards for Existing Facilities are Fully Implemented	<u>EGU Compliance Rate:</u> 0.24 lb/mmbtu No Performance Standards	<u>EGU Compliance Rate:</u> 0.25 lb/mmbtu Performance Standards for Existing Facilities are Fully Implemented	<u>EGU Compliance Rate:</u> 0.23 lb/mmbtu No Performance Standards

3. CONTROLS FOR INDUSTRIAL SOLVENT CLEAN-UP, INK MANUFACTURING AND PLASTIC PARTS COATING

The Clean Air Act requires that states establish Reasonably Available emission Control Technology (RACT) for major sources of VOC emissions that are located in certain nonattainment areas. RACT is defined as the lowest emission rate required of a source considering technological and economic feasibility. Three categories of sources of VOC emissions that were not included in previous ozone attainment plans must now be controlled to RACT levels. They are industrial solvent clean-up, ink manufacturing and plastic parts coating.

Revisions to Chapter NR 423 are being proposed to establish RACT requirements for VOC emissions generated at solvent cleanup operation located in the primary ozone control region. The proposed rule will rely upon emission restrictions, operational practices, control systems and record keeping requirements. In this case, emissions restrictions are essentially equivalent to VOC content limitations for industrial cleanup solvents. These limitations will encourage material substitutions toward industrial cleanup solvents with lower VOC contents. Compliance with this RACT requirement is estimated to reduce daily VOC emissions in the nonattainment counties from 0.1 tons per day to 0.6 tons per day.

Several different industrial sectors use clean-up solvents including fabricated metal products, except machinery and transportation equipment; chemicals and allied products; printing, publishing and allied industries; industrial and commercial machinery and computer equipment; and furniture and fixtures. A stakeholder review effort has been initiated to elicit technical advice and comment on the proposed rule. This proposal is not anticipated to result in a major level of effort in regard to compliance cost or record keeping.

The Department is pursuing administrative consent orders to achieve the RACT requirements for VOC emissions at ink manufacturing and plastic parts coating operations. An analysis of ink manufacturers in the nonattainment area identified one source qualifying for RACT restrictions. That company owns and operates equipment used to mix, transfer and store ink and ink ingredients containing VOC. RACT for Ink Manufacturing requires lids on all equipment used for mixing ink and ink ingredients. This order will likely be finalized before the Ozone Attainment Demonstration is submitted to EPA in December. VOC reductions from this order are projected at approximately 0.1 tons per day. Administrative consent orders establishing RACT for VOC emissions from the major plastic parts coating operations are also likely to be finalized before December. VOC reductions from these orders effort are projected at less than 0.1 tons per day during the ozone season.

If the Ink Manufacturing or Plastic Parts Coating orders are not finalized and in effect by 2000, or if the number of sources identified grows significantly, an expedited rule development process will be needed to establish RACT for these categories so the requirements can be effective by May 1, 2002.

4. EXCESS VOC EMISSIONS FEE

The proposed plan includes revisions to NR 410.06 to satisfy a provision of the Clean Air Act that requires major VOC sources, under certain conditions, to pay an excess emissions fee of \$5000/ton of VOC. The fee would apply to the portion of their emissions beyond 80% of an annual 2007 baseline level as defined in the rule. The fee applies to sources with more than 25 tons of VOC emissions per year located in the six severe nonattainment counties of Kenosha, Milwaukee, Ozaukee, Racine, Washington and Waukesha. The fee activates if the area remains in nonattainment for ozone in 2008 and thereafter. The fee is incorporated into the emissions inventory fee structure and would not apply in 2008 if the area receives a formal one-year extension to reach attainment.

5. STATE IMPLEMENTATION PLAN (SIP) REVISIONS FOR OZONE

By December 31, 2000, Wisconsin is required to submit to EPA revisions to its State Implementation Plan (SIP) that will result in the attainment of the one-hour ozone standard throughout Wisconsin. These plan revisions, and their associated rules and programs, represent the third phase of a series of attainment demonstrations developed to address the one-hour ozone problem in eastern Wisconsin. These air quality improvement strategies combine federal, regional and local emission controls sufficient to demonstrate attainment of the one-hour ozone standard by 2007. At the present time, the following counties are designated as severe nonattainment areas for the one-hour ozone standard: Kenosha, Manitowoc, Milwaukee, Ozaukee, Racine, Washington and Waukesha. Sheboygan and Kewaunee Counties were originally designated moderate areas. Walworth County was designated marginal, and Door County was designated as a marginal, rural transport area.

Door, Walworth, and Sheboygan Counties were reclassified as attainment based on air quality improvement that occurred during the mid-90's, without the benefit of a formal regional ozone attainment demonstration. For Door County, EPA revoked the 1-hour standard based on 1995 to 1997 air quality data after the 8-hour standard was promulgated. This was based on a presumption that the 8-hour standard and NOx SIP Call would be driving regional ozone plans and would ensure regional attainment by 2007. EPA has recently proposed that Door County should be reclassified to marginal rural transport and Sheboygan County should revert to a maintenance area.

The Department previously adopted a series of VOC emission reduction measures to improve air quality in eastern Wisconsin and to meet intermediate VOC control targets required by the 1977 and 1990 Clean Air Act amendments. Now in order to attain the one-hour ozone standard, modeling shows further reductions of VOC and NOx emissions must be pursued in Wisconsin and in upwind states. The level of VOC and NOx emissions that must be achieved in 2002, 2005 and 2007 and the options for achieving those levels for the stationary and mobile source sectors are shown in **Table 2**.

Current ozone formation modeling for the Lake Michigan region indicates the need to achieve the level of VOC and NOx emission control proposed through this plan in order for Wisconsin areas to demonstrate attainment and maintenance of the 1-hour ozone standard. An overview of the ozone modeling effort is part of Appendix 4.

This SIP revision does not address the ambient air quality problem in Wisconsin associated with exposure to ozone concentrations above an average of 0.08 ppm over an 8-hour period. There is a well-established negative public health impact associated with such repeated exposures. A long-standing effort to address that problem led to promulgation of the 8-hour ozone standard by EPA in 1997 as required by the Clean Air Act. While the 8-hour standard is the subject of ongoing litigation in federal court, it's still prudent to determine how "close" this 1-hour Ozone Attainment Plan comes to meeting the 8-hour standard. Details on this topic are found in **Appendix 4**.

6. POTENTIAL AFFECTED PARTIES AND STAKEHOLDER INPUT

As part of the ozone planning process during the last several years, all significant NO_x and VOC emission sectors, including mobile, stationary, and area sources have been the subject of emission control evaluations for the period 2001 through 2007. Recent evaluations have focused primarily on stationary source NO_x control. Department staff received extensive stakeholder input on the form and levels of the NO_x emission limits proposed and will be continuing that effort to refine a final proposal for adoption. Significant levels of additional VOC control will take longer to develop and will be more expensive to pursue on a ton-for-ton basis.

Stakeholder groups that have been involved in the development of the NO_x control elements in the plan include electric utilities, the Wisconsin Paper Council, Wisconsin Manufacturers and Commerce and the Department of Administration, the Department of Transportation, the Public Service Commission, the Department of Commerce, and other state and local agencies. Outreach for development of RACT rules for VOC emissions include a more focused stakeholder effort for eastern Wisconsin. If added VOC controls (beyond the current RACT effort) become necessary, statewide associations representing the operators that might be affected by VOC content limits would be invited to participate in a new initiative.

7. PRIOR INVOLVEMENT OF THE NATURAL RESOURCES BOARD

The Board has previously adopted several sets of administrative rules to address the requirements of the Clean Air Act related to ozone attainment. The ROP plans for 1996 and 1999 focused on VOCs and the vehicle emissions testing program. Those efforts were directed at emission reductions in and surrounding the nonattainment counties and did not address regional ozone transport or reductions in regional ozone levels. This plan represents an effort to assure continued reduction in ozone levels to meet the standard by establishing limitations on NO_x emissions.

The Department also worked with stakeholders in 1999 to respond to EPA's NO_x SIP Call. In April, 1999 the Board authorized hearings on proposed rules needed to implement the NO_x SIP Call that focused on electric utility and large industrial sources of NO_x in 22 states in the eastern U.S. That regulatory effort is on hold pending the outcome of federal litigation.

8. FISCAL IMPACTS

The proposed rule could affect state government in terms of the costs incurred by the Department of Administration (DOA) in reducing NO_x emissions from Boiler B25 at the University of Wisconsin's Charter Street Heating Plant. Boiler B25 is a potentially affected source under one or more of the NO_x control options to meet the ROP requirements. This facility may have to reduce NO_x emissions by approximately ___ to ___ percent from 1995 levels through the implementation of _____ or _____ emissions performance standards specified in the rule package.

The proposed rule could also affect local government, specifically Manitowoc, since Manitowoc Public Utilities owns and operates two sources in the Primary Ozone Control Region. Using EPA cost estimates, the total annual cost of compliance with the proposed rule could be as high as _____ for the DOA and _____ for the Manitowoc utility. These numbers represent the upper bound in the capital cost of the proposal. Any additional best combustion management practices for local or state facilities that might result from ROP requirements that involve emission performance standards for smaller sources performance standards would be expected to result in net fiscal savings in long term fuel and maintenance costs.

Fiscal Estimate – NO_x Controls at Government-Owned Facilities

Government Source	NO _x Reduction - <i>Proposed Performance Standard</i> (Tons per Day)	Total Annual Cost (\$)
Manitowoc Public Utility		
Dept of Administration		

In terms of program management costs, the Department of Natural Resources is responsible for implementing this plan after it is adopted. Staff in the Bureau of Air Management will be able to oversee the implementation of the new plan as part of their ongoing responsibilities to achieve the 1-hour ozone standard and to issue permits connected with that objective.

9. ENVIRONMENTAL REVIEW FOR POTENTIAL IMPACT

An environmental analysis of the impact of the proposed rule revisions is not needed because these changes are considered to be a Type III action under s. NR 150.03(3), Wis. Adm. Code. A Type III action is one that normally does not have the potential to cause significant environmental effects, normally does not significantly affect energy usage and normally does not involve unresolved conflicts in the use of available resources.

10. SMALL BUSINESS ANALYSIS

Small businesses will not be directly affected by the proposed rules for controlling VOC and NO_x emissions. The regulations for NO_x control would apply to industries large enough to have existing

steam boilers, industrial process heaters, furnaces, combustion turbines or stationary reciprocating engines with at least 50 million BTU per hour (or equivalent) of heat (energy) input. The RACT regulations for VOC control apply to major sources. Some indirect impact, due to slight changes in electricity rates, may be experienced by small businesses. However, the cost of control for newly installed or completely refurbished equipment in the proposal is significantly less than the retrofit cost for existing units and such costs would be subject to the same tax incentives and extended amortization as the expenditures for the core combustion unit. Requirements proposed for 2005 and later regarding best combustion management practices are anticipated to result in aggregate cost savings for fuel and maintenance.

11. COMPARISON WITH FEDERAL REQUIREMENTS

The proposed revisions to the state NO_x emission control program, as set forth in NR 428, are needed to meet provisions in the federal Clean Air Act that require the state to craft and implement a Plan to meet the one-hour ambient air quality standard for ozone. The CAA requires attainment of that standard as expeditiously as practicable, but not later than 2007. The CAA requires that minimum emission reduction milestones are met in the period before attainment and that contingency measures are implemented in the event these ROP plans do not achieve timely reductions. The CAA also requires the plan to include components that assure maintenance of the standard beyond 2007. Therefore, the proposed plan meets and does not exceed federal requirements.

Appendix 1- Proposed VOC and NOx Emission Controls to Achieve the 1-Hour Ozone Standard

Ozone Control & Maintenance Regions in Wisconsin	Offsets for Major NOx Sources ¹	Minimum Performance Standards for New Facilities ²	Minimum Performance Standards for Existing Facilities	Rate-of-Progress Plan for 2002	Rate-of-Progress Plan for 2005	Rate-of-Progress & Maintenance Plan for 2007
Primary Ozone Control Region (Region 1)	<u>1</u> to 1	Required 2001	<u>2002</u> or <u>2005</u> ³	<u>0.24 – 0.30 lb/mmbtu³</u> EGU System Average Emission rate depends upon emission reductions from I/M and Performance Standards	<u>0.23 – 0.28 lb/mmbtu³</u> EGU System Average Emission rate depends upon emission reductions from I/M and Performance Standards	<u>0.23 – 0.27 lb/mmbtu³</u> EGU System Average Emission rate depends upon emission reductions from I/M and Performance Standards
Secondary Ozone Control Region (Region 2)			2005 or 2007 ³	No ROP Requirement	No ROP Requirement	Emission Rate to be Established for Ozone Maintenance
Primary Ozone Maintenance Region (Region 3)	No Offset Requirement	Permit Target 2001-2006	2007	No ROP Requirement	No ROP Requirement	No ROP Requirement
Secondary Ozone Maintenance Region (Region 4)		Required 2007	<u>Not Required</u>			

1 - Offset requirements for NOx apply to new sources that are issued permits after 1/1/2001.

2 - Optional approaches to Rate-of-Progress Reduction include minimum NOx emission performance standards for stationary sources and I/M cutpoints for NOx that impact the EGU system average emission rate levels. The levels shown include NOx cutpoints (~0.03 difference). Average rates apply 5/1 of appropriate year.

3 - Performance Standards for new facilities apply to all new sources not otherwise subject to LAER or PSD-based BACT that are issued permits after the effective date of the rule.

APPENDIX 2

STATIONARY SOURCE CONTROL OPTIONS

Overview

The proposed NO_x controls in NR 428 include performance standards for new and larger existing sources, with provision for corporate system-wide averaging of emissions for the electric utility facilities located in and directly affecting the ozone nonattainment counties in eastern Wisconsin. Performance standards are set by fuel type, and by combustion unit type and size. The proposed corporate system-wide averaging provides for a simplified trading program as a compliance tool for sources adopting adequate NO_x emission monitoring and tracking systems. The structure also provides for inter-system trades between entities with facilities subject to similar control targets.

The proposed Primary Ozone Control Region includes the 9 counties in southeastern Wisconsin designated as severe, serious or moderate nonattainment areas under the Clean Air Act. For 2005 and 2007 the ozone control area is proposed to expand to include the counties that have emissions that directly affect peak one-hour concentrations in the nonattainment counties. For the purposes of this plan, Wisconsin has been divided into four “ozone control regions” in order to define and apply controls to a level and in a time-frame commensurate with their general contribution to the ozone attainment problem. Two regions are defined as Ozone Control Regions and two are defined as Ozone Maintenance Regions.

To maintain air quality meeting the ozone one-hour standard into the future, NO_x emission caps are established in the Primary and Secondary Ozone Control Regions. Emission performance standards for new, significantly modified, rebuilt and relocated NO_x sources are set to a level that limits incremental NO_x growth. Along with these limits, new sources will require NO_x offsets of 1:1 (or greater) for installations permitted after 2000.

Proposed NO_x control “options” for the intermediate milestone years of 2002 and 2005 range from a modest control effort focused on a broad range of sources in the applicable region(s), to a robust control effort that reflects a strong commitment by a small number of the largest NO_x sources in Primary Ozone Control Region. The options in 2007 apply limits for existing facilities to the Primary and Secondary Ozone Control Region. Broader area requirements would be among the most cost-effective options as they are directed at operating efficiency and combustion improvement rather than catalyst-based post-combustion NO_x control.

Control Regions

The proposed ROP options for 2005 request comment on applying controls within the Secondary Ozone Control Region as well as the Primary Ozone Control Region. For 2007, options for comment include expanding the control area to include the Primary Ozone Maintenance Region for performance standards and for the large utility emissions averaging program. This largest region considered includes control for new facilities and a firm cap on future NO_x emissions.

The Plan proposes performance-based controls for the purpose of attainment and maintenance on all existing large NO_x sources in the Primary and Secondary Ozone Control regions. That 30 county area stretches from Grant in the southwest, diagonally northeastward to Brown County and the additional counties to the south and east.

System Average NO_x Emission Limits for Large Utility Sources

A principle NO_x reduction component of the earlier phases of the NO_x Control Plan are “system” or “corporate” average emission rate limits for large utility units in the defined region(s). These rates are

calculated on an average ozone season day basis and reflect the proportionate contribution of all the affected units under a single entity's control. The "final" attainment year rate (2007) is suggested to be a 0.24 lbs/mmbtu average while options are delineated to vary this target rate upward in the progress milestones of 2002 and 2005. The least restrictive rate anticipated as an average is 0.30 lbs/mmbtu for 2002 and 0.27 lbs/mmbtu for 2005 for the core control region.

In the proposal, inter-system NOx credit trading is considered a basic compliance option. Buyer and seller credits need to be calculated on an equivalent basis to ensure that the ROP reduction objectives are met and most such "trades" would be based on Part 75 monitoring. The trading currency ensures that an equivalent mass of NOx is reduced whether based on intra-system or inter-system exchanges. For intra-system calculations of the average rate, a less intensive monitor requirement is established for particular units where the Part 75 monitors do not exist for other purposes.

Emission Performance Standards for New and Existing NOx Sources

Another component of the NOx Control Plan is a series of Emission Performance Limits for new and existing large sources. These standards are designed to set a simple NOx reduction objective consistently across the boiler and combustion source populations in the areas that impact unhealthy ozone concentrations. These performance standards are anticipated to provide a cost saving in many applications while reducing aggregate NOx levels. (*Figures 2-1 and 2-2 delineate the proposed emissions performance standards.*)

The existing facility standards are proposed to apply in 2007 to sources in the Primary and Secondary Ozone Control Regions and in the Primary Ozone Maintenance Region. Options in the ROP plans note a potential staging of the standards to target the largest facilities before the smaller combustion sources. Though not proposed for the Secondary Ozone Maintenance Region, the standards represent one recommended means of maintaining the zero NOx growth planning objective for that part of Wisconsin. The proposal indicates the need for a facility compliance plan for meeting this standard within the existing operation permit by 2006 or whenever the facility renews its standing permit. The proposed compliance date is May 1, 2007.

The standards for new facilities, and newly refurbished or relocated sources, help ensure maintenance of the ozone standard into the future while ensuring that air quality problems associated with longer averaging periods (ozone, PM and haze) are not made worse as new facilities are located in Wisconsin. The new facility standards would not apply to facilities subject to the typically more restrictive control requirements of the New Major Source (NSR) and Prevention of Significant Deterioration (PSD). Instead, these standards would apply to facilities falling below those programs' source size or potential-to-emit thresholds. For the Lake Michigan region, these standards are important because the area maintains its formal NSR exemption for NOx for the ozone nonattainment counties. Under the proposal, these limits would be advisory for areas outside the Primary and Secondary Ozone Control Regions and enforceable inside that region in 2001.

Capping and Offsetting NOx Emissions

Another component of the Ozone Attainment Maintenance Plan is an ozone season NOx cap on aggregate emissions from the Stationary Source sector. Combined with that cap is a 1-to-1 emissions offset requirement for new sources in the affected regions. The cap is established with the offsets requirement for the Primary and Secondary Ozone Control Regions and becomes a planning objective only for the Primary and Secondary Maintenance Regions. The cap is based on the sector NOx level shown necessary to reach attainment in the current ozone modeling. The 2007 baseline is set at the reduced NOx level projected for attainment in the Primary Control Region and at the baseline 1995/96 level for the Secondary Control Region.

Offsets can be generated from facilities that use monitors specified in 40CFR75. The offsets must meet the regular criteria including being excess to the NOx reduction levels established under this plan for either a facility or system basis for the 2007 attainment plan.

(Comment is requested on expanding enforcement of the Offsets Requirement to new facilities in one or more of the other defined ozone control regions.)

See CONTROL REGION MAP (Figure 2) & EMISSIONS CONTROL MATRIX (Appendix 1)

Compliance Demonstration, Emissions Monitoring and Permits

INSERT LANGUAGE CONSISTENT WITH NR 428 SECTIONS

Table 2-1. Performance Standards for Existing Stationary Sources

Source Category	Requirement (1)	Basis for Requirement	Monitoring Requirement
EGU Boilers > 500 mmbtu/hr in Primary Ozone Control Region	0.3 lbs/mmbtu - 2002 0.27 lbs/mmbtu - 2005 0.25 lbs/mmbtu - 2007	ROP Requirements	1
Combustion Modification Based Limits			
Solid Fuel Fired Boilers > 100 mmbtu/hr (units < 25% CF exempt)			
Cyclone:	0.45 lbs/mmbtu	OFA and w/ LEA	2
Stoker:	0.25 lbs/mmbtu	OFA-Modification / NOx Optimization w/ LEA	2
Fluidized Bed:	0.15 lbs/mmbtu	OFA-Modification / NOx Optimization w/ LEA	2
Pulverized Coal:	0.30 lbs/mmbtu	Low Nox Burner w/ LEA	2
Gas/Oil Fired Boilers > 100 mmbtu/hr (units < 25% CF exempt)	0.10 lbs/mmbtu	Low Nox Burner w/ LEA	2
Gas Fired Reheat, Annealing, Galvanizing Furnaces > 100 mmbtu/hr (units < 25% CF exempt)	0.10 lbs/mmbtu	Low Nox Burner w/ LEA	2
Glass Furnace > 250 mmbtu/hr	6.0 tons/ton pulled glass	Installation of Hot Air Staging w/ LEA	2
Combustion Turbines > 50 MW equivalent	Gas: 75 ppm Oil: 110 ppm	Dry Low NOx Burners	2
Reciprocating Engines > 4000 bhp	Rich-Burn.....9.5 gr/bhp Lean Burn.....10.0 gr/bhp Distillate Fuel.....8.5 gr/bhp Dual Fuel..... 6.0 gr/bhp	Spark Ignition: Air/Fuel Adjustment Compression Ignition: Ignition Timing Retard	2
GOOD COMBUSTION PRACTICE – minimum requirements			
Solid Fuel Boilers > 50 mmbtu/hr (units > 15% CF exempt)	NOx Optimization/ Continuous LEA	Low Excess Air	2
Gas/Oil Fired Boilers > 50 mmbtu/hr (units > 20% CF exempt)	NOx Optimization/ Continuous LEA	Low Excess Air	2
Cement and Lime Kilns and Calciners > 50 mmbtu/hr	NOx Optimization/ Continuous LEA	Low Excess Air	2
Reheat, Annealing, Galvanizing Furnaces > 50 mmbtu/hr	NOx Optimization/ Continuous LEA	Low Excess Air	2
Glass Furnaces @ CF 25%	NOx Optimization/ Continuous LEA	Low Excess Air	2

Gas/Oil Fired Process Heaters, Dryers, Ovens, and Asphalt Plants > 50 mmbtu/hr	Annual Tune-up	Low Excess Air	1
Boilers < 50 mmbtu/hr	Annual Tune-up	Low Excess Air	1
Combustion Turbines >10 MW equivalent	Gas: 75 ppm Oil: 110 ppm	NOx Optimization	1

Table 2-2. New Source Performance Standards

Source Category	Applicable Threshold	Requirement (1)	Minimum Monitoring
Solid Fuel Fired Boilers	=> 250 mmbtu/hr	0.15 lbs/mmbtu	NOx, O2, CO, Flowrate CEM
Solid Fuel Fired Boilers	< 250 mmbtu/hr	0.20 lbs/mmbtu	NOx, O2, CO, Flowrate CEM
Gas Fired Boilers	> 25 mmbtu/hr	0.035 lbs/mmbtu	NOx, O2, CO, Flowrate CEM
Recovery Boilers	NA	0.10 lbs/mmbtu	NOx, O2, CO, Flowrate CEM
Cement Kilns, Lime Kilns, and Calciners	NA	0.10 lbs/mmbtu	NOx, O2, CO, Flowrate CEM
Reheat, Annealing, Galvanizing Furnaces		0.10 lbs/mmbtu	NOx, O2, CO, Flowrate CEM
Glass Furnaces	2 tons/ton pulled glass	4 tons/ ton pulled glass	NOx, O2, CO, Flowrate CEM
Gas/Oil Fired Process Heaters, Dryers, Ovens, Asphalt Plants and other external combustion sources	> 50 mmbtu/hr	0.1 lbs/mmbtu	Periodic NOx, O2, CO, fuel consumption
Combustion Turbines	10 MW < 10 MW	Gas 9 ppm Oil: 25 ppm Gas: 42 ppm Oil: 65ppm	Periodic NOx, O2, CO, fuel consumption
Reciprocating Engines > 1000 hp	Rich-Burn > 1000 hp Lean Burn > 1000 hp Distillate Fuel >1800 hp Dual Fuel > 2000 hp	2.5 gr/bhp 3.0 gr/bhp 2.5 gr/bhp 2.5 gr/bhp	Periodic NOx, O2, CO, fuel consumption

APPENDIX 3

Demonstration of Progress in Reducing VOC Emissions

Areas designated as nonattainment for the 1-hour ozone standard are required to reduce VOC emissions 3% per year from “adjusted” 1990 levels until the areas attain the ozone standard and get reclassified. For severe ozone areas, Rate of Progress (ROP) plans are required to meet milestone years in 1996 (15%), 1999 (24%), 2002 (33%), 2005 (42%) and 2007 (48%). For each milestone plan, an additional 3% reduction is required as a contingency measure. The first ROP SIP revision was submitted in late 1993. The 1999 ROP SIP revision was submitted in 1997. The SIP revision for the remaining ROP milestones is due as part of the attainment demonstration.

For areas where NO_x control is necessary or appropriate as a strategy to reduce ozone concentrations NO_x reductions may be substituted for VOC reductions. EPA guidance allows NO_x reductions as a substitute for VOC reductions for ROP milestones beginning in 1999.

Wisconsin’s ROP SIP revisions for the 1996 and 1999 used only VOC emission reductions. Reductions in VOC emissions were believed to be the most appropriate means to improve ozone air quality. The 1996 ROP Plan (“15% Plan”) for SE Wisconsin primarily relied on the CAA control measures to reach a 15% VOC reduction. Federal programs to reduce VOC emissions included reformulated gasoline, clean fuel fleets, and revised motor vehicle emission standards. State plan elements included VOC RACT for major sources, enhancement to the I/M program, Stage 2 gasoline fueling vapor recovery, solvent limits for various coatings applications and a handful of “voluntary” industrial solvent regulation enhancements. Emission reduction elements from the 1996 ROP and additional emission reductions from federal programs, when projected, suggested that no additional Wisconsin specific VOC reductions were needed to meet the 1999 ROP requirement. VOC emission reductions are expected to continue, but these will not be sufficient, by themselves, to meet future ROP requirements. NO_x emission reductions will be needed to cover ROP and contingency requirements in 2002, 2005, and 2007. The ROP emission reduction goal plus the 3% contingency emission reduction goal for these milestone years are 36% in 2002, 25% in 2005, and 51% in 2007.

The EPA has developed guidance on NO_x emission reduction substitution in ROP plans. This guidance requires a technical demonstration to support the claim that NO_x emission reductions are effective. NO_x emission reductions may be substituted for VOC emission reductions so long as the VOC percentage reduction from the 1990 VOC adjusted emissions baseline plus the NO_x percentage reduction from the 1990 NO_x adjusted emissions baseline, when added together, are greater than or equal to the required ROP percentage reduction.

The four Lake Michigan states previously received a waiver to the NO_x RACT controls otherwise required for the Severe Ozone counties in Wisconsin. The waiver was based on modeling performed through 1994. Subsequent regional ozone control modeling efforts, beginning with the OTAG modeling from 1995 through 1997, established the need for regional NO_x reductions to address ozone attainment across the Eastern US, including in the Lake Michigan area.

The current air quality modeling for the Lake Michigan region, conducted for this attainment demonstration, verifies the need for strong regional NO_x control to further reduce ozone concentrations. While additional

VOC emission reductions in large metropolitan areas will reduce ozone levels they are more expensive than regional NOx emission reductions

Summary of the Post-2000 NOx-based Progress Plans:

Tables 3-1 through 3-6 illustrate the proposed VOC and NOx emission reductions necessary to meet the 2002, 2005 and 2007 ROP milestones. They show estimates of the actual VOC and NOx reductions from the adjusted 1990 baselines achieved through continued implementation of the 1996 and 1999 plans.

The area proposed for ROP emission reductions is the “Primary Ozone Control Region.” The Primary Ozone Control Region includes the nine nonattainment counties that were included in the 1996 ROP plan. For the 2007 attainment demonstration, a Secondary Ozone Control Region, incorporating an additional 21 counties with emissions shown to directly impact ozone attainment, is defined in rule as the region where emission reduction requirements will apply. The percent emission reduction requirements are translated into ROP budgets that define the NOx emission reduction targets for affected sources (*see Appendix 1 – NOx Control Plan Summary Matrix and Control Regions Map*).

VOC emissions for 2002, 2005 and 2007 are slightly higher than prior estimates because of new information on activity levels and creditability of emission reductions. Under this proposal, the additional emission reductions needed future ROP milestones (including the 3% contingency) will be achieved by reducing NOx emissions. Emission reductions are shown for the Primary Ozone Control Region.

Comments are requested on the appropriateness of ROP controls on sources in the Primary Ozone Control Region versus expanding the Progress-related NOx control effort to sources in the Secondary Ozone Control Region or other appropriate geographic options.

Table 3-1 Proposed Ozone ROP Budgets – 2002, 2005, 2007

% Reduction Relative to “1990 Adjusted Baseline”	2002 (“36%”)		2005 (“45%”)		2007 (“51%”)	
	VOC 333 tpd Baseline	NOx 393 tpd Baseline	VOC 331 tpd Baseline	NOx 391 tpd Baseline	VOC 331 tpd Baseline	NOx 390 tpd Baseline
Primary Ozone Control Region Budget	234 tpd	368 tpd	225 tpd	340 tpd	218 tpd	324 tpd
Creditable Reduction	29.8%	6.2%	32%	13%	34.1%	16.9%

Table 3-2 1-Hr Ozone Attainment Demonstration – Proposed Mobile Sector Budgets

Counties with Ozone Attainment or Maintenance Conformity Budgets	2002		2005		2007	
	VOC (TPD)	NOx (TPD)	VOC (TPD)	NOx (TPD)	VOC (TPD)	NOx (TPD)
Milwaukee, Racine, Kenosha, Waukesha, Washington, & Ozaukee	44.39	94.85- 106.64 ¹	37.86	77.77- 86.01	33.35	66.53- 71.91
Sheboygan	4.45	9.36- 10.26	3.84	7.75- 8.36	3.41	6.78- 7.17
Manitowoc & Kewaunee	6.56	11.77	6.27	10.11	6.20	9.00

¹Denotes Budget with and without I/M cutpoints, assumes high VMT growth and 7.5% buffer

Table 3-3 Rate-of-Progress Requirement for 2002

2002 Planning Objective = **6.2% NO_x and 29.8% VOC** Reduction to Adjusted 1990 Baselines, the Incremental **NO_x Reduction Target = 66 Tons per Ozone Day** for 9 Counties (Region 1)

(Baseline is 393 Tons, Forecast Emissions are 436 Tons, 93.8% of Baseline=368 Ton Budget)

Control Measures Evaluated for Progress 2002:

Sector – Measure	Tons Impact 2002	Cost Range (\$/Ton)
Mobile - I/M Cutpoints on May 1, 2001	12	
Performance Standards for Existing Facilities	9	
Utility – System Emission Rate 0.30 Assumes both I/M Cutpoints and Perf. Standards.	42	
Utility – System Emission Rate 0.25 Assumes neither I/M Cutpoints nor Perf. Standards	66	

Discrete 2002 Plan Options for Comment:

- Option A: I/M Cutpoints, Performance Standards, and EGUs emission rate 0.30 lb/mmbtu
Option B: I/M Cutpoints, No Performance Standards, and EGU emission rate 0.27 lb/mmbtu
Option C: No I/M Cutpoints, Performance Standards, and EGU emission rate 0.26 lb/mmbtu
Option D: No I/M Cutpoints, No Performance Standards, and EGU emission rate 0.24 lb/mmbtu

Table 3-4 Rate-of-Progress Requirement for 2005

2005 Planning Objective = **13% NO_x and 32% VOC** Reduction to Adjusted 1990 Baselines, the Incremental **NO_x Reduction Target = 71 Tons per Ozone Day** for 9 Counties (Region 1)

(Baseline is 391 Tons, Forecast Emissions are 419 Tons, 87% of Baseline=340 Ton Budget)

Control Measures Evaluated for Progress 2005:

Sector – Measure	Tons Impact 2002	Cost Range (\$/Ton)
Mobile - I/M Cutpoints on May 1, 2001	8	
Performance Standards for Existing Facilities	9	
Utility – System Emission Rate 0.28 Assumes both I/M Cutpoints and Perf. Standards	54	
Utility – System Emission Rate 0.23 Assumes neither I/M Cutpoints nor Perf. Standards	71	

Discrete 2005 Plan Options for Comment:

- Option A: I/M Cutpoints, Performance Standards, and EGUs emission rate 0.28 lb/mmbtu
Option B: I/M Cutpoints, No Performance Standards, and EGU emission rate 0.25 lb/mmbtu
Option C: No I/M Cutpoints, Performance Standards, and EGU emission rate 0.25 lb/mmbtu
Option D: No I/M Cutpoints, No Performance Standards, and EGU emission rate 0.23 lb/mmbtu

Table 3-5 Rate-of-Progress Requirement for 2005

2005 Planning Objective = **13% NOx and 32% VOC** Reduction to Adjusted 1990 Baselines, the Incremental **NOx Reduction Target = 74 Tons per Ozone Day** for 9 Counties (Region 1)
(Baseline is 391 Tons, Forecast Emissions are 419 Tons, 87% of Baseline=340 Ton Budget)

Control Measures Evaluated for Progress 2007:

Sector – Measure	Tons Impact 2002	Cost Range (\$/Ton)
Mobile - I/M Cutpoints on May 1, 2001	6	
Performance Standards for Existing Facilities	9	
Utility – System Emission Rate 0.27 Assumes both I/M Cutpoints and Perf. Standards	59	
Utility – System Emission Rate 0.23 Assumes neither I/M Cutpoints nor Perf. Standards	74	

Discrete 2007 Plan Options for Comment:

- Option A: I/M Cutpoints, Performance Standards, and EGUs emission rate 0.27 lb/mmmbtu
- Option B: I/M Cutpoints, Performance Standards, and EGU emission rate 0.24 lb/mmmbtu
- Option C: No I/M Cutpoints, Performance Standards, and EGU emission rate 0.25 lb/mmmbtu
- Option D: No I/M Cutpoints, No Performance Standards, and EGU emission rate 0.23 lb/mmmbtu

Table 3-6 - OPTIONS FOR MEETING RATE-OF-PROGRESS Requirement

<u>Options for NOx Control to address ROP</u>	Option 1A EGUs and Large Industrial Sources	Option 1B Large EGUs only	Option 2A EGUs and Large Industrial Sources	Option 2B Large EGUs only
	With NOx Cutpoints <i>Includes Performance Standards in 2001 for New Facilities</i> Cutpoints = 12 tpd in 2002, 8 tpd in 2005 & 6 tpd in 2007		Without NOx Cutpoints <i>Includes Performance Standards in 2001 for New Facilities</i>	
<u>2002 NOx Budget</u> 368 tpd with 66 tpd reduction objective	<u>EGU Compliance Rate:</u> 0.30 lb/mmbtu Performance Standards for Existing Facilities are Fully Implemented	<u>EGU Rate Compliance:</u> 0.27 lb/mmbtu No Performance Standards	<u>EGU Compliance Rate:</u> 0.26 lb/mmbtu Performance Standards for Existing Facilities are Fully Implemented	<u>EGU Compliance Rate:</u> 0.24 lb/mmbtu No Performance Standards
<u>2005 NOx Budget</u> 340 tpd with 71 tpd reduction objective	<u>EGU Compliance Rate:</u> 0.28 lb/mmbtu Performance Standards for Existing Facilities are Fully Implemented	<u>EGU Compliance Rate:</u> 0.25 lb/mmbtu No Performance Standards	<u>EGU Compliance Rate:</u> 0.25 lb/mmbtu Performance Standards for Existing Facilities are Fully Implemented	<u>EGU Compliance Rate:</u> 0.23 lb/mmbtu No Performance Standards
<u>2007 NOx Budget</u> 324 tpd with 74 tpd reduction	<u>EGU Compliance Rate:</u> 0.27 lb/mmbtu Performance Standards for Existing Facilities are Fully Implemented	<u>EGU Compliance Rate:</u> 0.24 lb/mmbtu No Performance Standards	<u>EGU Compliance Rate:</u> 0.25 lb/mmbtu Performance Standards for Existing Facilities are Fully Implemented	<u>EGU Compliance Rate:</u> 0.23 lb/mmbtu No Performance Standards

Appendix 4

Attainment Modeling for the 1-Hour Ozone Standard

Introduction:

The four Lake Michigan states of Illinois, Indiana, Michigan and Wisconsin have been pursuing the development of a regional agreement to demonstrate attainment of the 1-hour ozone standard for the last 10 years. The Lake Michigan Air Directors Consortium (LADCO) provides the platform for regional air quality assessment. Efforts have included an intensive field study on ozone formation in the region followed by several regional ozone air quality modeling and data assessment efforts since 1990. The LADCO states have entered into memorandum of understanding to pursue these regional evaluations and related control programs studies in an attempt to reach regional agreement on ozone attainment efforts.

Over the last year, LADCO has modeled a series of regional control strategies to define the control level necessary to demonstrate attainment by 2007. Those efforts include emission controls for VOC and NO_x from upwind states. This provides a basis for assessing the additional NO_x (and/or VOC) control effort needed regionally, in the three states of Illinois, Indiana and Wisconsin, to meet a US-EPA “test” for modeled attainment in a Lake Michigan receptor area.

Notable control elements in the baseline for all the attainment modeling include:

- the most recent federally-adopted new vehicle and equipment emission standards,
- the 1996 and 1999 ROP reductions and RACT measures for VOC for all areas in the modeling domain,
- Stage 2 vapor recovery, enhanced I/M and other CAA regulations like reformulated gasoline applied to the appropriate Lake Michigan areas,
- the impact on heavy duty diesel truck NO_x emissions associated with the 1998 engine manufacturer consent decrees,
- Clean Air Act mandated controls including the Title 4 Acid Rain NO_x reductions.

Current Status:

With the recent federal Appellate Court decision reinstating the NO_x SIP Call for Michigan, Illinois and Indiana, but not Wisconsin, the most recent modeling effort has been structured consistent with the Court’s decision. The modeled attainment demonstration strategies reflect a NO_x SIP level of reduction for IL, IN and MI and a lessor effort on the part of WI.

Due to the uncertainty created by the Court’s decision on the NO_x SIP Call, the LADCO states could not reach agreement on attainment modeling. DNR completed a modeling assessment to support this attainment demonstration assuming the application of the NO_x SIP Call in every state except Wisconsin. Those modeling results are discussed below.

Ozone Modeling Summary:

LADCO uses a system of three models to evaluate the effects of various ozone control strategies on the Lake Michigan region. The meteorological model provides detailed estimates of meteorological variables such as wind fields, temperature, solar radiation and humidity for use in the chemistry model. The emissions model has the capability to adjust emissions for time of day and day of week, distribute emissions to the appropriate

geographic areas and separate emissions into various chemical species for processing in the chemistry modeling. Using the output from the emissions and the meteorological model, the chemistry model simulates the transport and formation of ozone in the region. The resultant predicted ozone concentrations are used to determine if acceptable air quality is achieved under a given control strategy. DNR uses LADCO's modeling system and baseline information to test the effectiveness of various control programs that are of interest to us.

LADCO developed baseline inventories for the ozone episodes and used the emissions model to forecast 2007 baseline conditions. Control assumptions under assessment for the various reduction strategies were applied to the projected inventory baselines for the 2007 attainment tests. For the largest NO_x sources in the region, LADCO utilized average daily ozone season NO_x emissions assembled from 1995/96 ozone season monitoring data reported to EPA under the Acid Rain program. For sources and source categories without this continuous emissions monitor (CEM) data, LADCO applied economic growth forecasts to adjust daily estimates from data reported for 1996 under the states' annual inventory structures. For mobile sources, LADCO applied EPA's MOBILE model and applied adjustment factors to account for more recent regulations and technical modeling assumptions. Off-road engine and area source emissions were similarly grown and controlled in as consistent a fashion as could be applied by the four states.

LADCO conducted most of the modeling using a 12 Km grid structure. LADCO found that the finer 4 Km grid structure for the model did not improve model performance and greatly increased model run time. The current LADCO evaluations use four ozone episodes, two from the 1991 and two from 1995. The four episodes reflect ozone problems in slightly different parts of the Lake Michigan domain. Two of the four adequately reflect "typical" ozone episodes in Wisconsin.

Meeting US EPA's Attainment Test:

The 1996 EPA guidance for demonstrating 1-hr ozone attainment describes two acceptable approaches. The most difficult approach involves passing a deterministic test that requires a demonstration for all modeled days of predicted maximum ozone concentrations below 125 ppb, the 1-hour ozone *[monitoring]* standard. A second approach involves statistical tests for passing three benchmarks more reflective of the form of the standard. The statistical test incorporates an adjustment to reflect how severe the meteorology was during the modeled episode. If neither approach clearly demonstrates attainment, a "weight-of-evidence" determination may be conducted. The "weight-of-evidence" provides additional information to those reviewing the attainment demonstration to determine if attainment is probable in the real world even though the tests do not show attainment of the standard.

Attainment can be demonstrated with either approach as long as the modeling platform accurately predicts ozone under the tested conditions. Separate performance statistics are derived in the analysis to determine if projected peak concentrations are close enough and if there is any overall bias in the modeled output.

Modeling results show that implementation of NO_x controls incorporated in this rule package are sufficient to demonstrate attainment of the standard. These "local" NO_x control programs include ROP requirements for 2002, 2005 and 2007 plus some additional VOC and NO_x control in the primary and secondary ozone control regions. For the 1-hour ozone standard to be attained in Wisconsin, these local NO_x control programs have to be augmented by implementation of the NO_x SIP call in Illinois, Indiana and the other upwind states subject to the SIP call.

8-Hour Average Ozone Concentrations Resulting from Implementation of the 1-Hour Attainment Plan

Although implementation of the ozone control programs identified in the document will achieve attainment of the 1-hour ozone standard, they fall short of demonstrating attainment for the 8-hour standard. The modeling results show 8-hour ozone concentrations exceeding the standard in eastern Wisconsin. Additionally, ozone concentrations exceed the 8-hour standard in western Michigan, where Wisconsin sources significantly contribute to the high concentrations. If the 8-hour standard is eventually upheld in federal Court, additional NO_x and/or VOC reductions will be necessary in the Lake Michigan Region.